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April 2005

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Idaho Operations Office

INTEC 2005 Monitoring Well Installation Plan

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Idaho Completion Project

DOE/NE-ID-11207
Revision 1
Project No. 24668

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Prepared for the
U.S. Department of Energy
DOE Idaho Operations Office

ABSTRACT

This Well Installation Plan describes the installation of two well sets at the Idaho Nuclear Technology and Engineering Center, which is located at the Idaho National Laboratory. Each well set consists of two wells, one completed in the shallow perched water zone and a second dual-completion well, with one well completed in the Snake River Plain Aquifer and a BarCad™ sampler set in the deep perched zone. The wells will be installed using conventional air rotary drilling methods. Drill cuttings control will be achieved using a combination of (a) air-drilling with a Dust Hog or vacuum excavator system and/or (b) drilling with water. Downhole geophysical logging will be performed by the United States Geological Survey to further characterize subsurface conditions. Submersible pumps will be installed in each well prior to well development and groundwater sampling.

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ACRONYMS

ALARA	as low as reasonably achievable
BBWI	Bechtel BWXT Idaho, LLC
bgs	below ground surface
BLR	Big Lost River
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	chain of custody
COPC	contaminant of potential concern
DOT	Department of Transportation
DP/AQ	dual-completion deep perched/aquifer
DQO	data quality objective
DR	dual rotary
EPA	Environmental Protection Agency
FFA/CO	Federal Facility Agreement and Consent Order
FSP	field sampling plan
FTL	field team leader
HASP	health and safety plan
HDR	Hydrogeologic Data Repository
ICPP	Idaho Chemical Processing Plant
ID	inside diameter
IDW	investigation-derived waste
INEEL	Idaho National Engineering and Environmental Laboratory
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
LTMP	long-term monitoring plan
MSIP	Monitoring System and Installation Plan

MW	monitoring well
MWTS	Monitoring Well and Tracer Study
NA	not applicable
NIOSH	National Institute of Occupational Safety and Health
OD	outside diameter
OU	operable unit
PPE	personal protective equipment
PVC	polyvinyl chloride
PW	perched water
QA	quality assurance
QAPjP	Quality Assurance Project Plan
QC	quality control
RadCon	Radiological Control
ROD	Record of Decision
RWP	Radiological Work Permit
SP	shallow perched
STR	subcontract technical representative
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
USGS	United States Geological Survey
VOC	volatile organic compound
WAG	waste area group
WCF	Waste Calcining Facility

INTEC 2005 Monitoring Well Installation Plan

1. INTRODUCTION

This Monitoring Well Installation Plan describes monitor well drilling, downhole logging, well installation, and groundwater sampling activities to be performed during 2005 at the Idaho Nuclear Technology and Engineering Center (INTEC) located at the Idaho National Laboratory (INL)[a] (Figure 1-1). The installations of the two new well sets are being conducted as Phase 2 of the Monitoring System and Installation Plan (MSIP) for Group 4 (DOE-ID 2005a). The new monitoring wells are intended to investigate the occurrence of Tc-99 in perched water and groundwater beneath the northern part INTEC. This Monitoring Well Installation Plan has been added as Appendix P to the MSIP, and *supercedes Section 5.3 (Phase 2 Activities) of the MSIP.*

The Operable Unit (OU) 3-13 Record of Decision (ROD) requires that perched water zones be monitored to assess perched water drainout and downward flux of contaminants to the Snake River Plain Aquifer (SRPA) (DOE-ID 1999). Specific requirements and data quality objectives (DQOs) for the perched water monitoring program are spelled out in the MSIP (DOE-ID 2005a) and the *Long-Term Monitoring Plan for OU 3-13, Group 4 Perched Water* (DOE-ID 2004a).

As outlined in the MSIP, five well sets were installed during 2001 as part of the Phase 1 perched water investigation (Figure 1-2). The results of the Phase 1 study were reported in the *Phase I Monitoring Well and Tracer Study Report for OU 3-13, Group 4 Perched* (MWTS) (DOE-ID 2003). Further, the MSIP calls for the installation of two additional monitoring well sets south of the INTEC tank farm as part of Phase 2 of the perched water investigation. Following the completion of Phase 1, a decision was made that the Phase 2 investigation should be deferred until a later date pending review of the Phase 1 perched water monitoring results.

As part of the Phase 1 perched water investigation, monitor well ICPP-MON-A-230 was installed into the uppermost portion of the SRPA near the northern boundary of the INTEC (Figure 1-2). In May 2003, groundwater sampling at this new monitor well indicated that technetium-99 (Tc-99) was present in groundwater at concentrations approximately twice the derived maximum contaminant level (MCL) for Tc-99 of 900 pCi/L. This was the first time that Tc-99 concentrations in the aquifer had been found to exceed the MCL. An investigation of the occurrence of Tc-99 in groundwater was subsequently performed. The primary objective of the Tc-99 investigation was to determine the source or sources of Tc-99 to groundwater, with particular emphasis on the area near monitor well ICPP-MON-A-230 in the northern portion of INTEC. The results of the Tc-99 investigation were provided in *Evaluation of Tc-99 in Groundwater at INTEC: Summary of Phase 1 Results* (ICP 2004). During subsequent discussions between the Department of Energy Idaho Operations Office, the Environmental Protection Agency (EPA) and Idaho Department of Environmental Quality, it was determined that insufficient monitoring wells exist to determine the nature and extent of Tc-99 in groundwater south and southeast of the INTEC tank farm. As a result, the Agencies reached consensus that the Phase 2 monitoring well sets (which had been previously deferred/postponed) should be installed during 2005 to fill this data gap.

This Well Installation Plan describes the proposed locations, well design, and well installation methods for the Phase 2 well sets that are to be installed to investigate the occurrence of Tc-99 in perched water and groundwater beneath the northern part of INTEC. In accordance with the *Federal Facility Agreement and Consent Order (FFA/CO) for the Idaho National Engineering Laboratory*

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a. Beginning February 1, 2005, the name of the Idaho National Engineering and Environmental Laboratory (INEEL) was changed to Idaho National Laboratory (INL). The Idaho Completion Project (ICP) is the name of the project that is performing remediation work at the Idaho National Laboratory.

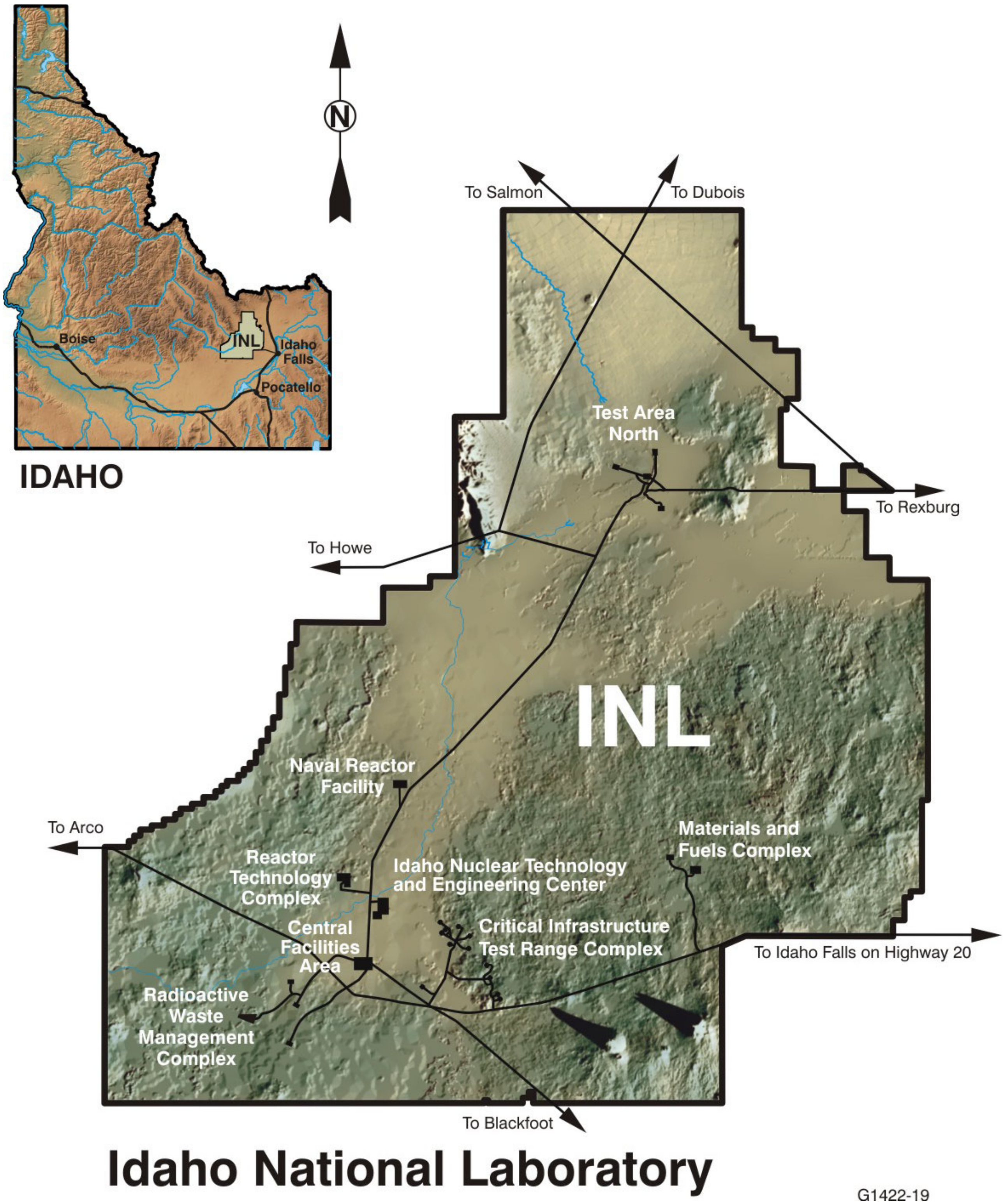

Figure 1-1. Map showing location of INTEC at the INL.

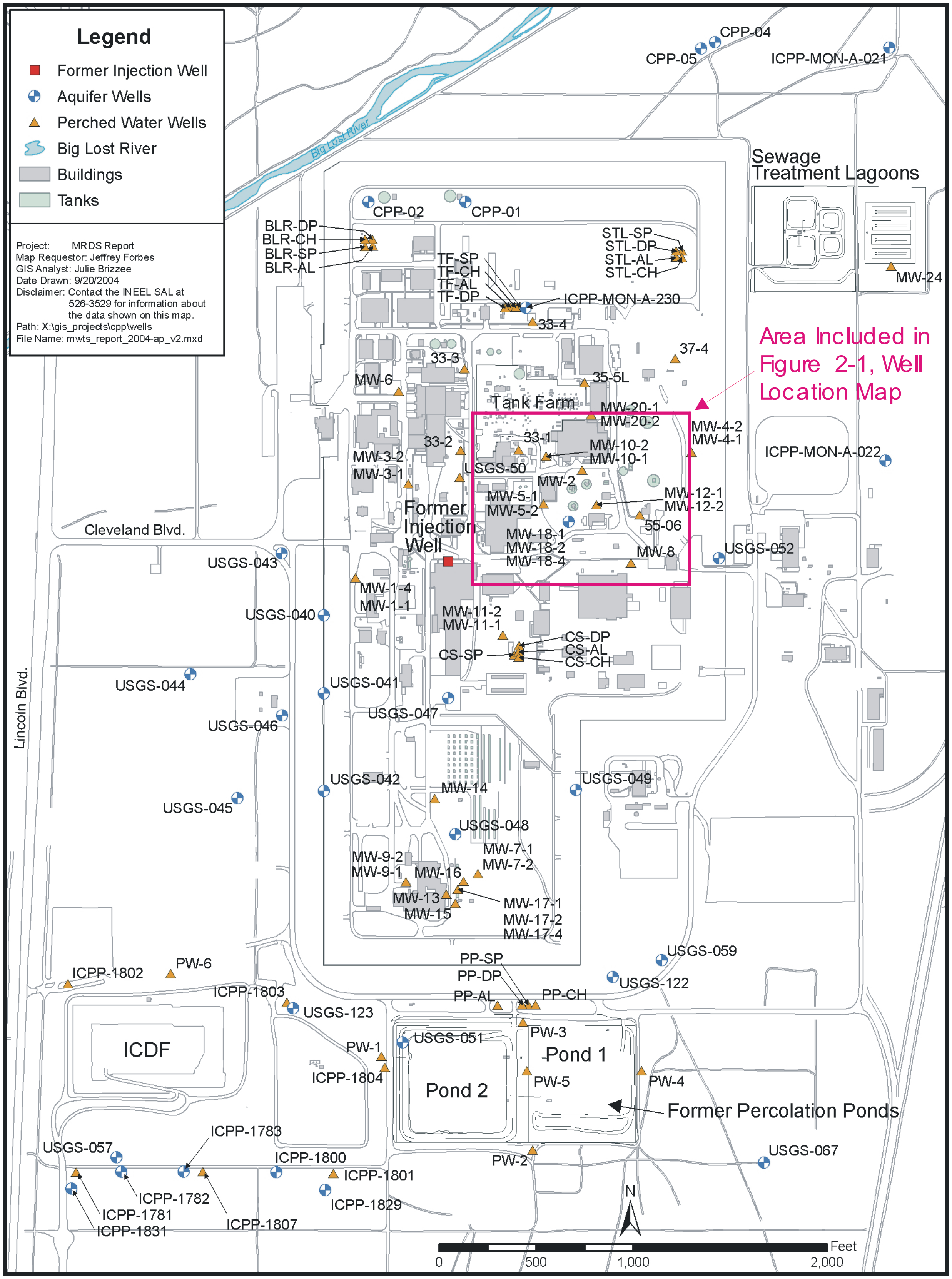

Figure 1-2. INTEC monitoring well location map.

(DOE-ID 1991), this plan is supported by several other documents and requirements, including the *Quality Assurance Project Plan for WAGs 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning* (QAPjP, DOE-ID 2004b). The activities will also be conducted in accordance with the "Project Execution Plan for the Idaho Nuclear Technology and Engineering Center, Subproject 6, Excess Facilities Disposition and D&D" (PLN-804), which, along with the Quality Assurance Project Plan (QAPjP), establishes the quality requirements for activities within the INL that are associated with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

These plans have been prepared pursuant to the "National Oil and Hazardous Substances Pollution Contingency Plan" (40 CFR 300) and EPA guidance for preparation of sampling and analysis plans (SAPs) (EPA 1988). The MWTS report (DOE-ID 2003) has additional background information regarding the INL, including site history, environmental setting, hydrogeology, and environmental regulatory history.

1.1 Purpose and Objectives

The overall purpose of the Phase 2 well sets is to provide hydrogeologic data needed for future remedial action decisions at INTEC. In particular, the Phase 2 well sets are intended to

1. Investigate the nature and extent of Tc-99 in perched water and groundwater south and southeast of the tank farm at INTEC

2. Determine the concentrations of other contaminants of concern in groundwater and perched water south and southeast of the tank farm (e.g., I-129, Sr-90)

3. Assist in determining groundwater and perched water flow directions and hydraulic gradients in the vicinity the tank farm

4. Corroborate (or refute) the current INTEC hydrogeologic conceptual model

5. Provide hydrogeologic data to support future computer contaminant transport modeling, including modeling associated with the OU 3-14 remedial investigation/feasibility study (in preparation) and the OU 3-13 remedial action report for Group 4 - Perched Water (DOE-ID 2004c)

6. Provide shallow perched water quality and water level data in the proximity of the Waste Calcining Facility (WCF), a structure closed to a Resource Conservation and Recovery Act landfill standard, to supplement the monitoring well system in the proximity of the WCF and Resource Conservation and Recovery Act WCF monitoring information.

1.2 Health and Safety Plan

Fieldwork associated with installation and sampling of the Phase 2 well sets will be conducted in accordance with the *Health and Safety Plan for Operable Unit 3-13, Group 4, Perched Water Project* (INEEL 2004). The Health and Safety Plan (HASP) will be amended, if necessary, through a document action request (DAR) before the commencement of any field activities.

1.3 Project Organization and Responsibilities

The project organizational structure reflects the personnel resources and expertise required for the completion of work activities discussed in this plan, while minimizing risks to workers. The organizational structure presented in the OU 3-13 HASP, Figure 10-1 (INEEL 2004), is current as of the time of writing this plan and will be updated as required. Shown in Figure 10-1 are job titles, responsibility delineation, and communication chains for personnel who will serve key roles at the work site.

1.4 Data Quality Objectives

The well sets described in this Well Installation Plan are being installed to answer specific questions that have arisen regarding groundwater flow and contaminant transport at INTEC. The principal study questions (PSQs) associated with the Phase 2 well sets are

1. What is the lateral extent of groundwater exceeding the Tc-99 MCL (900 pCi/L) south and southeast of the tank farm?

2. Does shallow or deep perched water exceed the Tc-99 MCL south and southeast of the tank farm?

3. What is the hydraulic gradient of the SRPA beneath the tank farm?

4. What is the predominant lateral direction of perched water flow near the tank farm?

The depths and locations of the new monitoring wells discussed in this plan are intended to help resolve these questions.

The Group 4 LTMP (DOE-ID 2004a) and the QAPjP (DOE-ID 2004b) provide extensive discussions regarding quality assurance/quality control (QA/QC) protocols that will be used during the Phase 2 well installation and groundwater sampling activities. Procedures for water-level measurements and groundwater sampling and laboratory analysis are also summarized in the LTMP (DOE-ID 2004a).

All laboratory-generated data will be validated to Level A, as outlined and defined in the QAPjP (DOE-ID 2004b). Field-generated data (e.g., water levels) will be validated through the use of properly calibrated instrumentation, comparing and crosschecking data with historical data for nearby wells, and recording all data collection activities in a field logbook.

2. WELL INSTALLATION DESIGN AND METHODS

This section discusses the well design and installation methodology for the drilling and installation of two monitoring well sets. Each well set will consist of two individual boreholes, one drilled and completed in the shallow perched zone and a deeper borehole drilled and completed as a dual deep perched/aquifer monitor well. The proposed locations of the Phase 2 wells are shown in Figure 2-1. Wells ICPP-2018 and ICPP-2019 are the proposed locations of the shallow perched wells, and ICPP-2020 and ICPP-2021 are the locations of the deep perched/aquifer wells. Agency agreement regarding well locations and design was reached during discussions held during October-November 2004. The proposed well locations appear to be supported by the data collected during colloidal borescope logging performed in MW-18-4 (aquifer well) on November 20, 2004. The groundwater flow direction at a depth of 471 ft bls in this well was observed to be to the east-southeast (azimuth 117º) at a velocity of 6.9 ft per day.

The rationale for the well design is

- Installation of a dual-completion deep perched/aquifer (DP/AQ) well minimizes drilling time and waste generation. A conventional aquifer skimmer monitor well will permit water-level monitoring and groundwater sampling, as well as pumping tests and colloidal borescope logging. The BarCad™ sampler installed in the deep perched zone will permit water-level monitoring and groundwater sampling.

- A separate shallow perched (SP) well will preclude the possibility of downward migration of poor-quality shallow perched water in the DP/AQ dual-completion well. The conventional shallow perched monitor wells will permit water-level monitoring and groundwater sampling, as well as pumping tests and colloidal borescope logging.

2.1 Shallow Perched Water Monitoring Wells

The following steps will be taken for the drilling and construction of the shallow perched monitoring wells. A well schematic is shown in Figure 2-2.

1. Drill from land surface into the top of the first competent basalt and install temporary casing having a minimum diameter of 11¾-in. O.D. A nominal 11-in. tri-cone roller bit will be used to drill through the alluvial material and 1 to 3 ft into the upper basalt unit. To minimize dust created during drilling, a vacuum excavation system or Dust Hog filter system will be attached to the return line to remove cuttings and dust from the air. The use of compressed air from the drill rig will be minimized or eliminated. In nearby wells, the top of the first basalt ranges from approximately 41 to 48 ft bls.

2. Install 6-in. carbon-steel surface casing with a drive shoe, through the temporary casing down to the competent basalt. The casing will be held approximately 1 ft off of the bottom of the borehole and cement grout will be placed into the borehole through the casing. The cement grout will be tagged through the annular space until it reaches an elevation 5 ft above the borehole bottom. The casing will then be lowered to the bottom of the borehole and secured to the basalt with pressure from the drill rig if necessary. A minimum 8-hour set time will be required before resumption of drilling. The remaining annular space will be filled with bentonite chips as the temporary casing is removed from the ground.

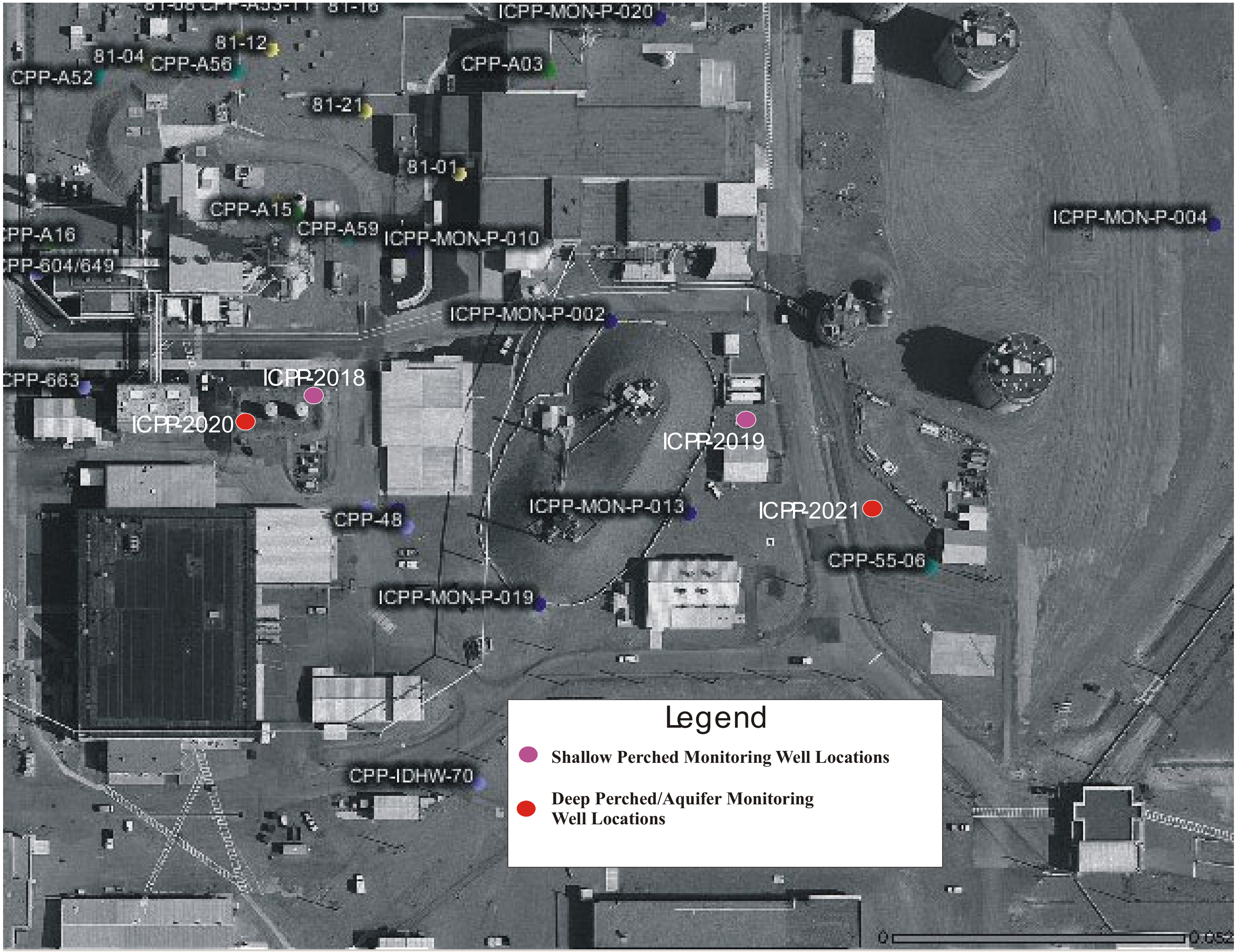

Figure 2-1. Proposed locations of Phase 2 wells.

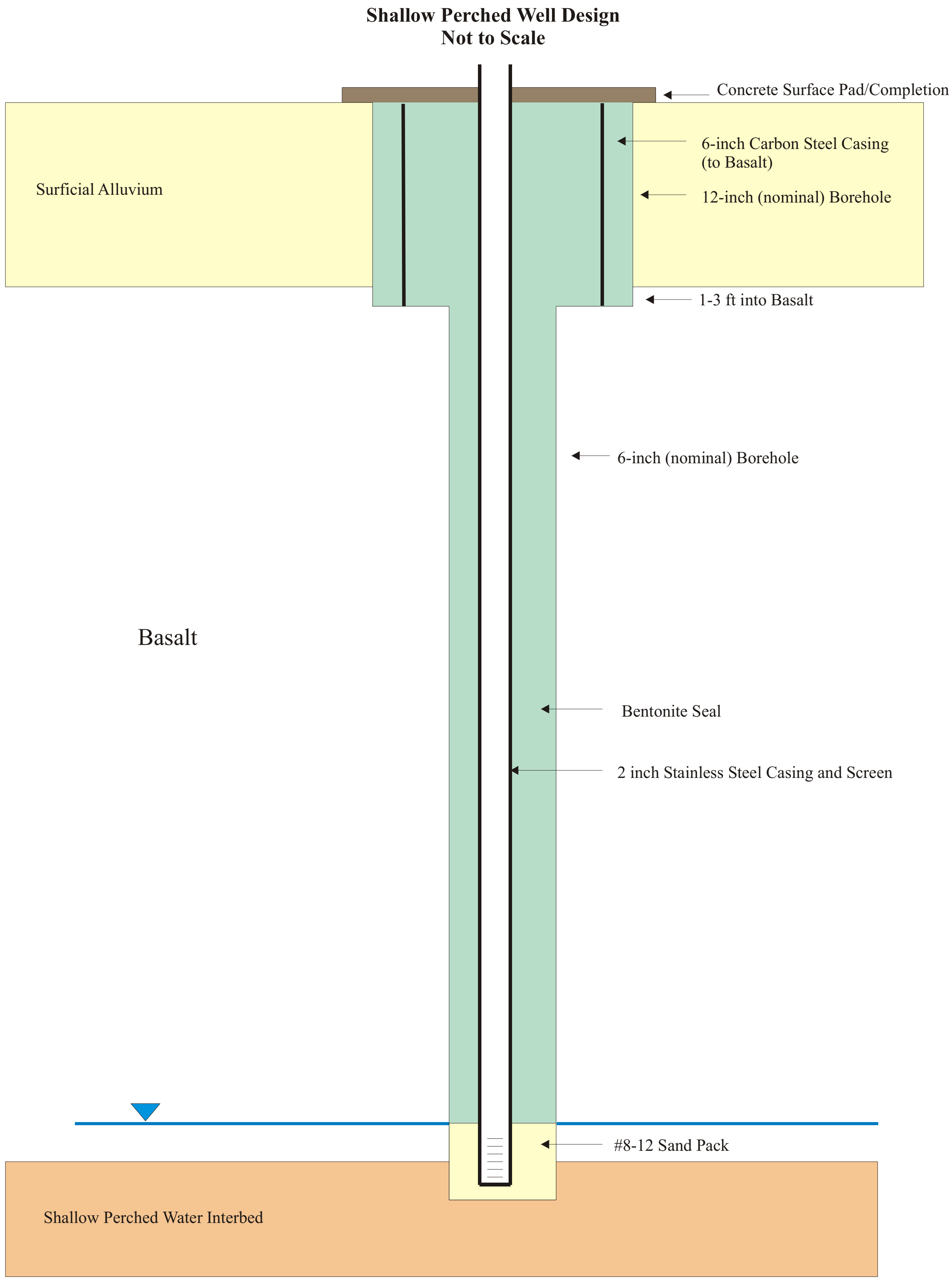

Figure 2-2. Schematic for shallow perched monitoring wells.

3. Air rotary drill (conventional air rotary with downhole hammer) a nominal 6-in.-diameter hole from the top of the first basalt to approximately 110 ft below bls to tag the 110-ft interbed. No water shall be added during air rotary drilling operations to facilitate the detection of perched groundwater on or in the sedimentary interbeds. The cuttings and circulation fluid will be discharged into a cyclone-type separator through a closed HEPA-filtered containment system.

4. If the material immediately above or within the 110-ft interbed is saturated, a 2-in. stainless-steel monitoring well will be installed. If the 110-ft interbed is dry, the borehole will be advanced to approximately 155 ft bls to drill into the 140-ft interbed. If the 140-ft interbed is dry, a decision will be made by the field team leader (FTL) and the subcontract technical representative (STR) where to install the well. The interbed that has the greatest potential to have saturated conditions will be monitored.

5. After completion of drilling, the United States Geological Survey (USGS) will perform a video and geophysical logging of the borehole, if schedule and borehole stability permit. The onsite geologist and/or STR will witness the logging of the borehole.

6. The well will be constructed using 2-in. Schedule 10 flush-threaded stainless-steel casing and screen. Up to 20 ft of stainless-steel Vee-Wire-type screen will be installed having a slot size of 0.020 in. A threaded stainless-steel bottom cap will be installed at the bottom of the well screen. A filter pack consisting of 8-12 silica sand will be placed in the annular space from the bottom of the screen to 7 ft above the screen.

7. After installation of the filter pack, the annular space will be backfilled to the surface with bentonite chips or granular bentonite through a tremie pipe.

8. The monitoring well will be developed through either air-lifting or over-pumping as directed by the subcontract technical representative and/or field team leader.

2.2 Aquifer and Deep Perched Monitoring Wells

The following steps will be taken for the drilling and construction of the aquifer and deep perched monitoring wells. A well schematic is shown in Figure 2-3.

1. Drill from land surface into the top of the first competent basalt and install temporary casing having a minimum of 24-in. O.D.. A nominal 24-in. tri-cone roller bit will be used to drill through the alluvial material and 1 to 3 ft into the upper basalt unit. To minimize dust created during drilling, a vacuum excavation system or Dust Hog filter system will be attached to the return line to remove cuttings and dust from the air. The use of compressed air from the drill rig will be minimized or eliminated. In nearby wells the top of the first basalt ranges from approximately 41 to 48 ft bls.

2. Install 20-in. carbon-steel surface casing with a drive shoe, through the temporary casing down to the competent basalt. The temporary casing will then be pulled back to a sufficient level to prevent it from contacting the cement grout. The 20-in. casing will be held approximately 1 ft off of the bottom of the borehole and cement grout will be placed into the borehole through the casing. The cement grout will be tagged through the annular space until it reaches an elevation 5 ft above the borehole bottom. The casing will then be lowered to the bottom of the borehole and secured to the basalt with pressure from the drill rig if necessary. A minimum 8-hour set time will be required. The remaining annular space will be filled with bentonite chips or granular bentonite as the temporary casing is removed from the ground.

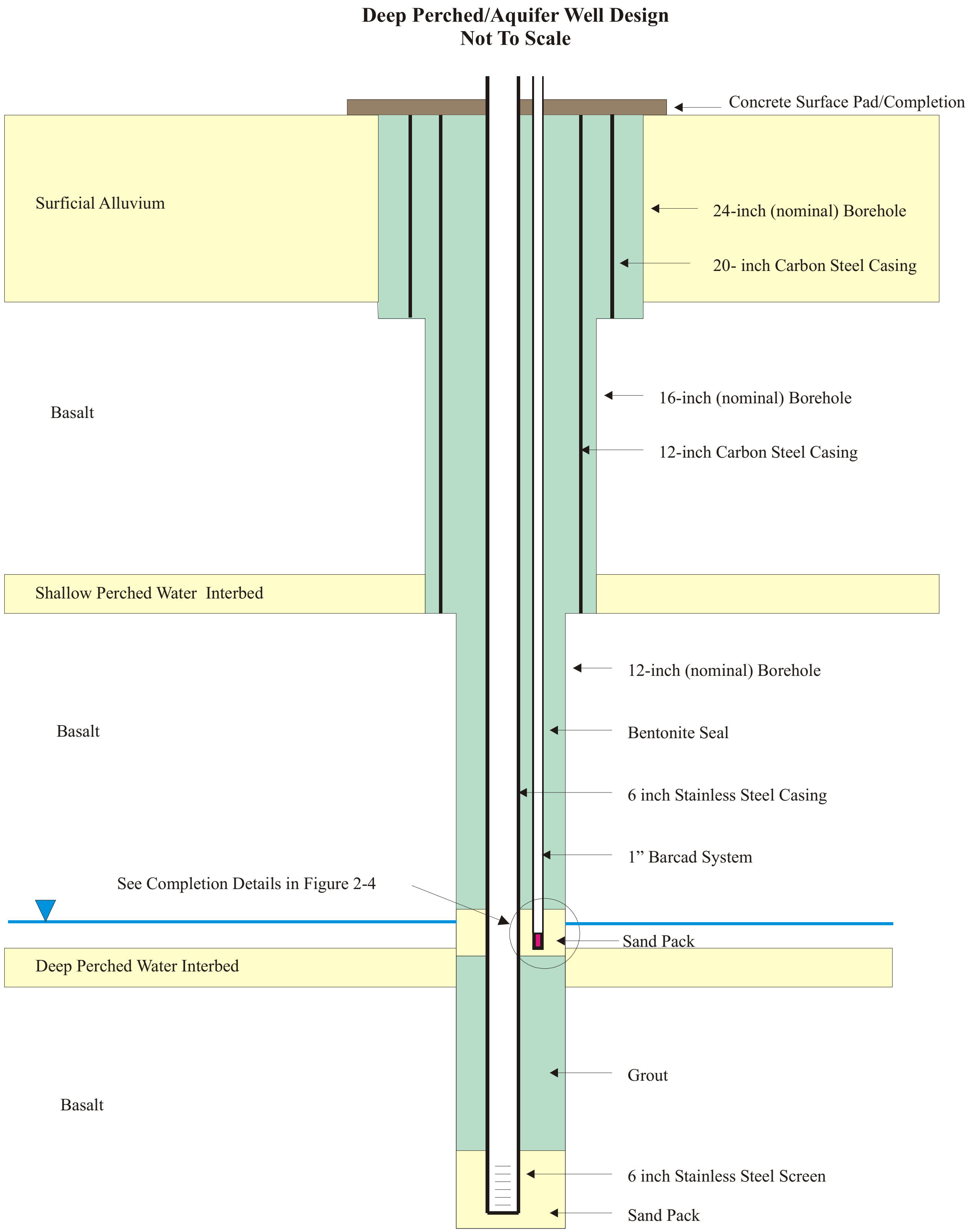

Figure 2-3. Schematic for deep perched monitoring wells.

3. After installation of the alluvium surface casing, the borehole will be advanced using conventional air rotary drilling to the base of the upper perched water zone. A nominal 16-in.-diameter bit will be used to advance the borehole into the basalt. The borehole will be advanced into competent basalt below the upper perching layer (approximately 155 to 160 ft bls), and 12 in.-diameter, carbon-steel casing with a drive shoe will be installed into the borehole. The casing will be held approximately 1 ft off of the bottom of the borehole and cement grout will be placed into the borehole through the casing. The cement grout will be tagged through the annular space until it reaches an elevation 5 ft above the borehole bottom. The casing will then be lowered to the bottom of the borehole and secured to the basalt with pressure from the drill rig. A minimum 8-hour set time will be required before resumption of drilling.

4. The annular space will be filled with bentonite chips or granular bentonite through a tremie pipe from the top of the cement grout to land surface.

5. The borehole will then be advanced below the upper perched water zone with conventional air rotary drilling and a nominal 12-in.-diameter bit. Water may be used in conjunction with the air rotary drilling to facilitate the drilling with concurrence of the FTL and STR. The 12-in.-diameter borehole will be advanced through the deep perched water zone and into the first highly permeable zone below the SRPA pieziometric surface. The exact drilling depths and well completion zone will be determined based upon geologic conditions and input from the project/field engineer, construction STR, and drilling supervisor.

6. After completion of drilling, the USGS will perform a video and geophysical logging of the borehole, if schedule and borehole stability permit. The onsite geologist and/or STR will witness the logging of the borehole.

7. Upon reaching total depth, 6-in.-diameter flush-coupled, threaded stainless-steel casing and screen will be installed to monitor the SRPA. The screen will be wire-wrapped having a slot size of 0.030 in. and measure 40 ft in length. An 8-12 mesh silica sand filter pack will be installed around the stainless-steel well screen from the bottom of the borehole to 7 ft above the top of the well screen.

8. The annular space above the filter pack to the base of the deep perched water zone (approximately 390 ft bls) will be sealed with granular bentonite using a tremie pipe. Potable water will then be poured through the tremie to hydrate the bentonite. A 1-in. BarCad™ sampler will then be placed down the borehole to approximately 380 bls. (Note: Based on borehole conditions, it may be necessary to strap the BarCad™ sampler to the 6-in. stainless-steel well casing as it is placed down the borehole with a pump protector on the leading end of the sampler to facilitate installation of the BarCad™ system.)

9. Once the BarCad™ sampler is in position at the proper depth, the annular space around the sampler will be backfilled with three different grades of silica sand (Figure 2-4). A 1-ft bottom lift of #3 mesh silica sand will be tremied into place on top of the bentonite seal (located approximately 5 ft below the bottom of the BarCad™ sampler). A 2-ft lift of 8-12 mesh silica sand will then be tremied in place, followed by a 5.5-ft lift of #60 Ogallala silica sand surrounding the BarCad™ sampler. A 4-ft lift of 8-12 mesh silica sand will then be tremied on top of the #60 sand followed by a 1-ft lift of #3 mesh sand. The use of coarser sand on the top and bottom of the BarCad completion zone is recommended by the manufacturer to reduce movement of the #60 sand, which acts as a filter for the BarCad pump intake.

10. The well's annular space above the BarCad^{TM} completion interval will be filled with bentonite chips or granular bentonite to the surface using a tremie pipe.

11. The aquifer well will be developed through either air-lifting or over-pumping as directed by the subcontract technical representative and/or field team leader. The BarCad system will be developed by pumping.

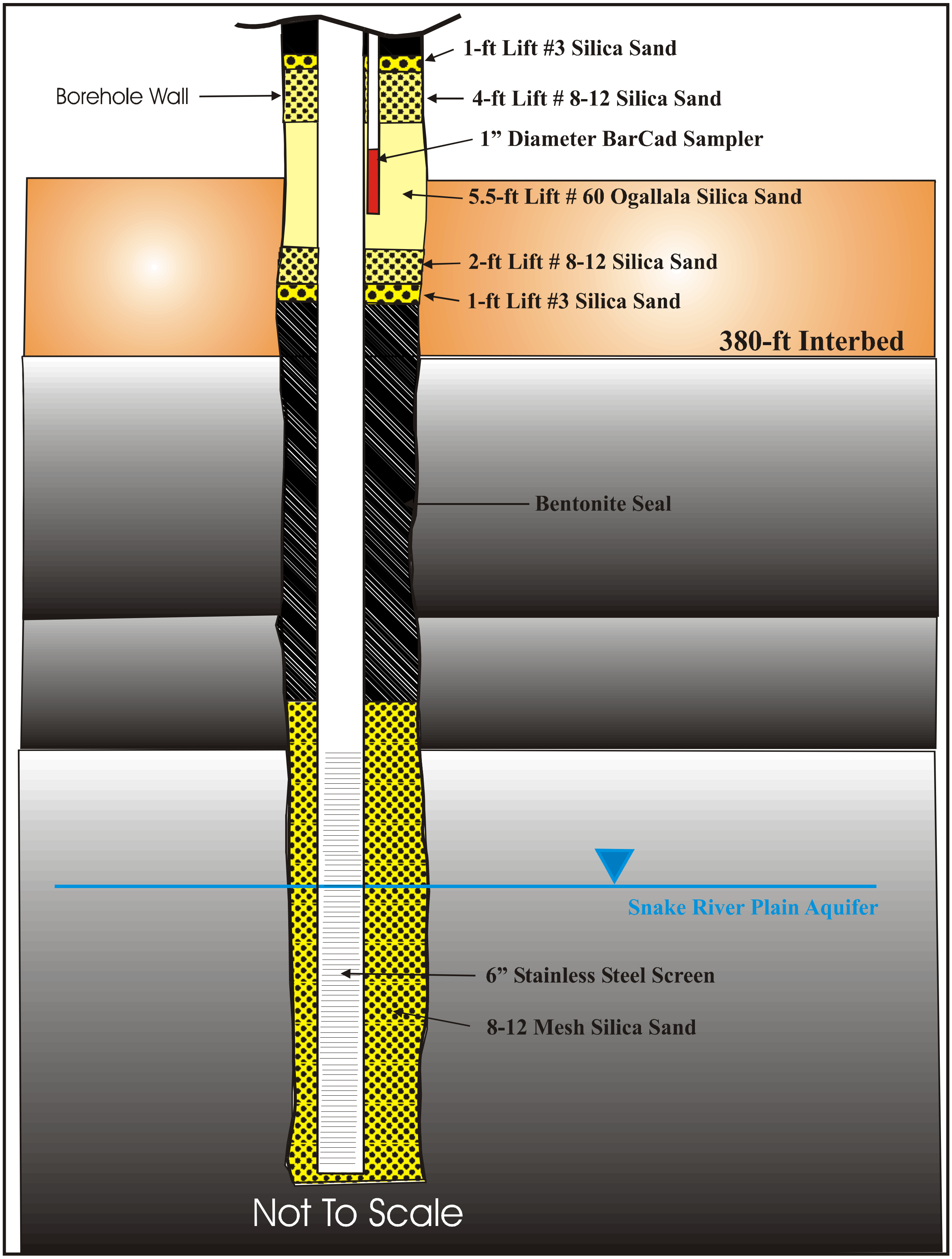

Figure 2-4. Depiction of BarCad™ installation.

3. DOWNHOLE GEOPHYSICAL LOGGING

A suite of downhole geophysical logs will be run by the USGS in each borehole, including

- Downhole video log (to identify sedimentary interbeds and fractured basalt zones)
- Natural gamma log (to define stratigraphy of basalt flows and sedimentary interbeds)
- Caliper log (measures borehole diameter to help identify interbeds and fractured zones)
- Neutron moisture log (to identify perched water zones).

4. GROUNDWATER SAMPLING AND ANALYSIS

Prior to sampling, groundwater elevations will be measured using either an electronic measuring tape (Solinst brand or equivalent) or a steel tape measure, as described in the LTMP (DOE-ID 2004a). Measurement of groundwater levels will be recorded to the nearest 0.01 ft in the field logbook.

Monitoring wells will then be purged prior to sample collection. During the purging operation, a Hydrolab (or equivalent) will be used to measure specific conductance, pH, and temperature. Samples for water quality analysis are to be collected after a minimum of three well casing volumes of water have been purged from the well and when three consecutive water quality parameters are within the following limits:

pH	± 0.1
Temperature	± 0.5°C
Specific conductance	± 10 µmhos/cm.

A flow-through cell will be used to collect water quality measurements. If the well goes dry prior to purging three well bore volumes, purging will be considered complete and samples collected no later than the end of the next business day following purging. If field water-quality parameters are still not stable after five volumes have been purged, samples will be collected and appropriate notations will be recorded in the logbook.

The QAPjP (DOE-ID 2004b) provides information regarding sample volumes, container types, preservatives, and maximum holding times. Sample bottles for groundwater samples will be filled to approximately 90 to 95% of capacity to allow for content expansion or preservation. Samples requiring acidification will be acidified to a pH <2 using ultra-pure nitric acid. The following is the preferred order for sample collection:

1. Temperature, pH, specific conductance (during purging)

2. Radionuclides (unfiltered)

3. Mercury (unfiltered).

Table 4-1 outlines the laboratory analytes for perched water and groundwater samples to be collected from the Phase 2 monitoring wells. Perched water samples will be collected from all Phase 2 wells that contain sufficient water. If a sufficient amount of water is present in the perched well, samples will be collected for all the analytes listed in Table 4-1. In wells with poor recovery where only partial sample sets can be collected, contaminants of concern (radionuclides and mercury) will have first priority.

Table 4-1. Perched water and groundwater laboratory analytes.

Radiochemistry	Target Analyte List Metals[a]	Anions	Other Laboratory Analyses	Field Measurement Parameters
Gross alpha	Aluminum	Chloride	Alkalinity	Temperature
Gross beta	Antimony	Bromide	Total dissolved solids	pH
Gamma Spec.[b]	Arsenic	Fluoride	Volatile organic compounds	Specific conductance
Plutonium isotopes	Barium	Nitrate	Hydrogen and oxygen stable isotope ratios	
Uranium isotopes	Beryllium	Sulfate		
Americium-241	Boron			
Iodine-129	Cadmium			
Neptunium-237	Calcium			
Strontium-90	Chromium			
Technetium-99	Cobalt			
Tritium	Copper			
	Iron			
	Lead			
	Magnesium			
	Manganese			
	Mercury			
	Nickel			
	Potassium			
	Selenium			
	Sodium			
	Silver			
	Thallium			
	Uranium			
	Vanadium			
	Zinc			

a. Both filtered (dissolved) and unfiltered (total) samples will be collected.

b. Includes Cs-137.

5. PERSONAL PROTECTIVE EQUIPMENT, EQUIPMENT DECONTAMINATION, AND WASTE MANAGEMENT PROCEDURES

This section describes the personal protective equipment (PPE), equipment decontamination, and waste management procedures required for this field effort. Before any field activities begin, a pre-job briefing will be held to review the requirements of the Installation Plan, HASP (INEEL 2004), Waste Management Plan (DOE-ID 2005b), project work order (PWO), and other work controlling documentation and to verify that all supporting documentation has been completed. In addition, at the termination of the sampling activities, a post-job review will be conducted in accordance with MCP-3003, "Performing Pre-Job Briefings and Documenting Feedback."

5.1 Personal Protective Equipment

The PPE required for this sampling effort is discussed in the HASP (INEEL 2004) and in the project-specific Radiological Work Permits (RWPs).

5.2 Drilling and Sampling Equipment

All downhole drilling equipment will be cleaned before the monitoring well drilling begins and again between well locations.

The decontamination methods for the drilling equipment will ensure containment of all decontamination fluids and dry-brush residuals and will minimize waste and contamination of equipment. Decontamination of nondedicated field equipment (sampling equipment) will be performed per GDE-162, "Decontaminating Sampling Equipment."

5.3 Management of Investigation-Derived Wastes

The waste generated during the well installation and sampling may include the following items:

- Drill cuttings
- Aquifer and perched purge water
- Contaminated PPE, wipes, bags, and other paper and plastic trash
- Contaminated drilling and sampling equipment
- Aqueous decontamination solutions
- Unused, unaltered, and altered sample material
- Used sample containers and disposable sampling equipment
- Used soil drums.

The disposition and handling of waste for this project will be consistent with the *Waste Management Plan for Operable Unit 3-13, Group 4, Perched Water* (DOE-ID 2005b). Samples will be handled in accordance with MCP-3480, "Environmental Instructions for Facilities Processes, Materials and Equipment," and PRD–5030, "Environmental Requirements for Facilities, Processes, Materials and Equipment." All waste streams generated from the project will be characterized in accordance with this plan or MCP-63, "Waste Generator Services – Industrial Waste Management," and will be dispositioned accordingly.

5.3.1 Waste Management

Waste generated during this project will be managed in accordance with the Group 4 Waste Management Plan (DOE-ID 2005b).

6. DOCUMENT MANAGEMENT AND SAMPLE CONTROL

Section 6.1 summarizes document management and sample control. Documentation includes field logbooks used to record field data and sampling procedures, chain-of-custody (COC) forms, and sample container labels. Section 6.2 outlines sample handling and discusses COC, radioactivity screening, and sample packaging for shipment to the analytical laboratories. Section 6.3 references the procedure to be used for revising this document.

6.1 Documentation

The FTL will be responsible for controlling and maintaining all field documents and records and for verifying that all required documents will be submitted to the INL Idaho Completion Project Administrative Records and Document Control. All entries will be made in indelible black ink. Errors will be corrected by drawing a single line through the error and entering the correct information. All corrections will be initialed and dated.

6.1.1 Sample Container Labels

Waterproof, gummed labels generated from the Sample and Analysis Management database will display information such as the unique sample identification number, the name of the project, sample location, and analysis type. Labels will be completed and placed on the containers in the field before sample collection. Information necessary for label completion will include sample date, time, preservative used, field measurements of hazards, and the sampler's initials.

6.1.2 Field Guidance Form

Field guidance forms verifying unique sample numbers provided for each sample location will be generated from the Sample and Analysis Management database. These forms contain the following information:

- Media
- Sample identification numbers
- Sample location
- Aliquot identification
- Analysis type
- Container size and type
- Sample preservation.

6.1.3 Field Logbooks

Field logbooks will be used to record information necessary to interpret the analytical data in accordance with Administrative Records and Document Control format and will be managed according to MCP-1194, "Logbook Practices for ER and D&D&D Projects."

6.1.3.1 Sample Logbooks. The field teams will use sample logbooks. Each sample logbook will contain the following information:

- Physical measurements
- All QC samples
- Sample information (sample location, analyses requested for each sample, sample matrix, gamma survey results)
- Shipping information (collection dates, shipping dates, cooler identification number, destination, COC number, name of shipper)
- Daily area activities
- Daily weather observations.

6.1.3.2 Field Team Leader's Daily Logbook. A project logbook maintained by the FTL will contain a daily chronological summary of the following items:

- All field team activities, including locations worked.
- List of site contacts.
- Problems encountered.
- This logbook will be signed and dated by the FTL at the end of each day's sampling activities.

6.1.3.3 Site Attendance Logbook. A project logbook maintained by the FTL will contain a daily summary of the following:

- Names of field personnel at the job site
- Company affiliation
- Time of entry into and exiting the job site.

6.1.3.4 Geologic Logbook. A geologic logbook maintained by the FTL or field geologist will contain a lithologic description of the subsurface materials encountered during drilling of the monitoring wells per the following:

- A separate geologic logbook will be used for each monitoring well installation.
- The logbook forms will be used to determine appropriate lithologic data.
- Well completion data will be recorded in the appropriate sections.

6.2 Sample Handling

Analytical samples for laboratory analyses will be collected in precleaned, laboratory-certified containers and packaged according to the American Society for Testing and Materials or EPA-recommended procedures. The QA samples will be included to satisfy the QA/QC requirements for the field operation as outlined in the QAPjP (DOE-ID 2004b). Qualified (Sample and Analysis Management-approved) analytical and testing laboratories will analyze the samples.

6.2.1 Sample Preservation

Samples will be preserved in accordance with the requirements in the QAPjP (DOE-ID 2004b). Samples that require cooling to 4°C will be placed in insulated coolers containing frozen, reusable ice immediately after sample collection and survey by RadCon.

6.2.2 Chain-of-Custody Procedures

The COC procedures will be followed in accordance with the QAPjP and MCP-3480, "Environmental Instructions for Facilities Processes, Materials and Equipment," and PRD-5030, "Environmental Requirements for Facilities, Processes, Materials and Equipment." Sample containers will be stored in a secured area accessible only to the field team members.

6.2.3 Transportation of Samples

Samples will be shipped in accordance with the regulations issued by the Department of Transportation (DOT) (49 CFR Parts 171 through 178) and EPA sample handling, packaging, and shipping methods (40 CFR 262.30). Samples will be packaged in accordance with the requirements set forth in MCP-3480 and PRD-5030.

Samples will be surveyed for external contamination and radiation levels after sample collection and before packaging for shipment. The shipping container also will be surveyed for external contamination and radiation levels before removal from the sampling area. Radiological control stickers indicating the survey results will be placed on each container. Removal of containers from the sampling area will be under the discretion of radiological control technicians.

The INTEC laboratory will perform gamma shipping screen analysis on the samples prior to shipment to the laboratory. Results of the shipping screen analysis will be used along with process knowledge to ensure that the sample shipments meet the DOT requirements as outlined in 49 CFR.

6.2.3.1 Custody Seals. Custody seals will be placed on all shipping containers in such a way as to ensure that sample integrity is not compromised by tampering or unauthorized opening. The seals will be signed by a member of the field team. Clear, plastic tape will be placed over the seals and the signature to ensure that the seals are not damaged during shipment.

6.2.3.2 On-Site and Off-Site Shipping. An on-Site shipment is any transfer of material within the perimeter of the INL. All materials to be shipped on-Site or off-Site will be properly characterized in compliance with DOT requirements under pertinent Department of Energy orders and 49 CFR 173.2, "Hazardous Materials Classes and Index to Hazardous Class Definitions." All shipping containers and related papers and manifests will have the proper shipping names as provided under 49 CFR 172.101, "Purpose and Use of Hazardous Materials Table." Site-specific requirements for transporting samples within INL boundaries and those required by the shipping and receiving department will be followed. Shipment within INL boundaries will conform to DOT requirements as stated in 49 CFR. Off-Site sample shipment will be coordinated with INL Packaging and Transportation personnel, as necessary, and will conform to all applicable DOT requirements.

6.2.3.3 Nuclear Material Control and Accountability. The past sampling and analysis results for interbed and water samples collected from monitoring well drilling indicates that little potential exists for exceeding the minimum reporting quantities specified in PRD-170 and PDD-103, “Nuclear Material Control and Accountability and Nuclear Materials Management.”

6.3 Document Action Requests

Revisions of this document will follow INL MCP-233, “Process for Developing, Releasing, and Distributing ER Documents.”

7. SCHEDULE

This project is expected to require 3 months of work after the drilling subcontractor mobilizes to the field. Table 7-1 gives the schedule of activities and durations for the project.

Table 7-1. Schedule of activities and durations for well installation.

Activity	Duration[a] (weeks)
Mobilize drilling subcontractor	1
Drill ICPP-2019 (shallow perched)	2
Drill ICPP-2021 (aquifer)	3
Drill ICPP-2018 (shallow perched)	2
Drill ICPP-2020 (aquifer)	3
Well development and sampling	1
Total	12

a. Estimates made based on the following assumptions: (a) 5 work days per week, 24 hours per day (120 twelve-hour shifts total) and (b) reduced efficiency due to working night shifts and winter conditions.

8. REFERENCES

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